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UNITED STATES
DEPARTMENT
OF AGRICULTURE

FOR PART-TIME
FARMERS AND
GARDENERS

FACT SHEET

MAKING AND USING COMPOST

What is Compost?

Compost is a dark, friable, partially decomposed form of organic matter similar in nature to the organic matter in the soil.

Why Make Compost?

Disposing of leaves, grass clippings, and other garden refuse is often a problem for gardeners, particularly in urban areas. These byproducts of the garden and landscape can be turned into useful compost with no more effort than it takes to bag and haul them away.

In many cases the compost will serve the same function as peat moss and thereby reduce gardening cost. Returning these organic materials to the land perpetuates natural biological cycles, and is an ecologically sensible means of using organic wastes.

The value of compost. Good compost consists of a small amount of soil along with decomposed or partially decomposed plant and animal residues. As a soil amendment, compost improves both physical condition and fertility. It is especially useful for improving soils that are low in organic matter.

The organic matter in the compost makes heavy clay soils easier to work by binding the soil particles together. Such aggregation of the soil particles helps improve aeration, root penetration, and water infiltration, and reduces crusting of the soil surface. Additional organic matter also helps sandy soils retain water and nutrients.

Although compost contains nutrients, its greatest benefit is in improving soil characteristics. Therefore, it should be considered a valuable soil amendment, and not a fertilizer, since, in most cases, additional fertilization will be necessary to achieve maximum growth and production.

Compost is also valuable mulching material to use around garden and landscape plants. It may be used as a "topdressing" for lawns and, when it contains a small amount of soil, as a growing medium for house plants or for starting seedlings.

How compost forms. Composting speeds natural decomposition under controlled conditions. Raw organic material is converted into compost by the action of microorganisms (fungi and bacteria). During initial stages of composting, microorganisms increase rapidly. As the materials decompose, some kinds of microorganisms predominate. But as they complete a certain function, these microorganisms decline while others build up and continue the decomposition.

As microorganisms decompose the organic materials, temperatures within the pile approach 140° to 160°F at the center. This kills some of the weed seeds and disease organisms in these high temperature areas. However, in cooler sections of the heap such sterilization does not occur.

Organisms that are largely responsible for the breakdown of the organic materials require large quantities of nitrogen. Therefore, adding nitrogen fertilizer or materials supplying large amounts of nitrogen is necessary for rapid and thorough decomposition. During the breakdown period this nitrogen is tied up, and not available for plant use. It is released, however, when the decomposition is complete, and the compost is returned to the garden.

What Materials May Be Composted?

Many types of organic materials can be used for composting—sod, grass clippings, leaves, hay, straw, weeds, manure, chopped corn cobs, corn stalks, sawdust, shredded newspaper, wood ashes, hedge clippings, and many kinds of plant refuse from the garden. Twigs should not be used because they decompose very slowly.

It is best not to use diseased plants from the flower or vegetable garden for composting if the compost is to be returned to the garden later. Although some disease are killed by heating during compost formation, unless the compost is turned frequently and thoroughly and allowed to remain unused for several years, some of these disease organisms may be returned to the garden with the compost. If diseases have not been a problem, this precaution may not be necessary.

Also, it is best to avoid composting weeds heavily laden with seeds. Even though some seeds are killed during composting, if the quantity of seeds is extremely high, many may be returned to the garden when the compost is used and create an unnecessary weed problem.

Most garbage may also be used in the compost heap,

with the exception of grease, fat, meat scraps, and bones. These may attract dogs or other animals, and may develop an odor during decomposition. Fats are slow to break down and greatly increase the length of time required before the compost can be used.

Making A Compost Heap

Locate the heap in a convenient but inconspicuous location. If the compost is to be used mainly in the garden, choose a nearby location. Since the compost pile needs to be kept moist, a convenient source of water is helpful. Compost should never get soggy wet or the decomposition process will stop. Therefore, don't locate a compost heap where drainage is poor and water may stand, even for short periods.

A shaded area is also desirable for best composting. However, don't locate compost heaps close to trees. Tree roots are easily attracted to the loose, moist, organic material developing at the bottom of the pile. During the summer, roots of some trees may spread rapidly throughout the lower areas of the heap, and make the compost difficult to dig and use.

Size of the pile. The size of pile needed may vary greatly with the amount of material available. A pile should not be less than 3 feet wide and 3 feet high. Anything smaller is too small to decompose properly. An average gardener might want a pile about 5 feet wide by 5 feet long by 5 feet deep. Where more compost is available, the heap should still be about 5 feet wide (for easy working) and any convenient length.

The average gardener may find that if adequate compost is available, two or three small piles provide greater flexibility than a single large one. In this way, a pile may be built and allowed to start undisturbed, while a second pile serves as a place to put organic materials as they accumulate. Three piles are even more ideal: one finishing, one in the process of decomposition, and one to which fresh materials are being added. In this way there is almost a continuous supply of compost.

The urban gardener may not have enough material to build several piles, or may not have room for them. In such situations, a single, tall pile may be satisfactory. Although not ideal, fresh materials may be added to the top, and decomposed material dug out from the bottom. This does not allow for turning, which aids complete decomposition and heating. Nevertheless, with limited space and material such a pile serves a definite and useful purpose.

Containing the pile. Although it is possible to stack the compost in a loose pile, decomposition is best and space is used more efficiently if it is made in some type of bin or enclosure. Many materials may be used. The sides should be loose enough to provide some air movement through them. One side should open for easy turning and removal of the compost. The heap may be round, square, rectangular, or other convenient shape.

Types of enclosures. Woven wire fencing (hog wire, chicken wire, chain link), wood slat fencing (snow fence), cement blocks, bricks, or scrap lumber can be used to enclose a compost heap. Fencing materials need corner supports, although a small round heap made of slatted fencing needs little or no support. If woven wire fencing is too loose to contain fine materials, line the enclosure with plastic (containing some aeration holes) to keep the pile neat and speed decomposition.

Bricks, or concrete blocks, may be piled without mortar, but space should be left between some of them to allow adequate air movement through the sides.

Scrap boards are suitable for sides since there is normally enough space between them for air movement. Lumber is gradually ruined by exposure to the damp compost, and occasionally boards have to be replaced as they decay.

Constructing the pile. Compost pile construction is usually described in terms of layers. In actual practice, such layers are less well defined. Layering is not totally essential, but provides the quickest and most complete decomposition.

Normally the pile may be started directly on the ground. However, to provide aeration to the bottom of the pile and improve drainage, a trench may be dug across the base of the area and covered with stiff wire mesh (hardware cloth) before the layers are begun.

Begin the pile by spreading a 6-to 8-inch layer of organic matter over the area. If there are different materials available, use the coarsest on the bottom. Shredded or chopped materials decompose fastest, so if a shredder is available, coarse organic matter should be run through it. Materials that tend to mat, such as grass clippings, should be placed in layers only 2 to 3 inches thick. Moisten, but do not soak, the layer of organic material.

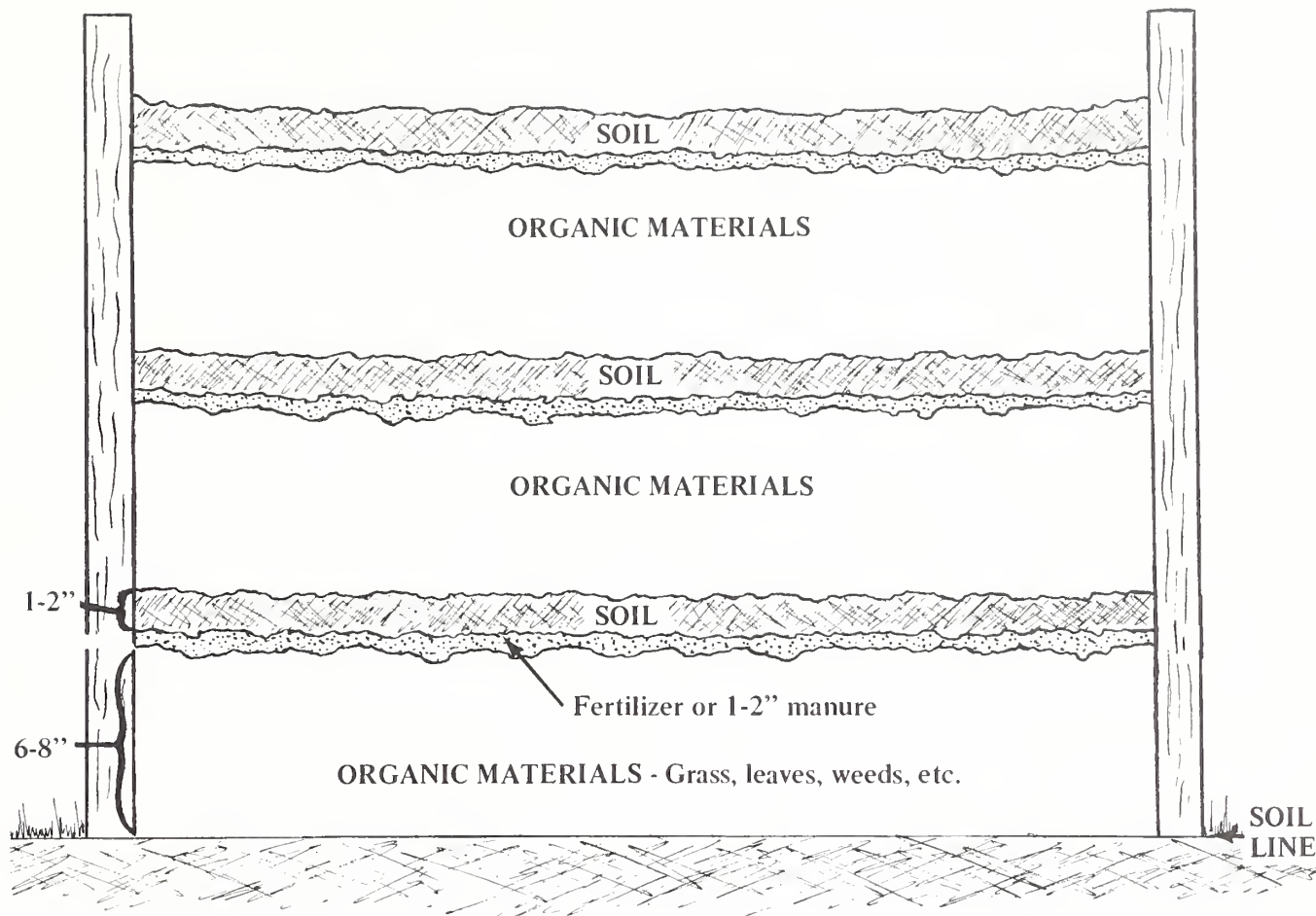
Over the layer of plant material, sprinkle a complete garden fertilizer such as a 12-12-12. About 1 cup for each 25 square feet of top surface area should be adequate. An equal amount of ground limestone may also be added to the compost unless the finished compost is later to be used for acid-loving plants.

If fresh animal or poultry manure is available, a 1- to 2-inch layer may be substituted for the commercial fertilizer.

Next, add a layer of soil or sod 1 to 2 inches thick. The soil contains microorganisms that help to start the decomposition process. If there is not an adequate source of topsoil, a layer of finished compost may be used as a substitute for the soil.

When soil or old compost and fertilizer are used for layering, special compost activators or starters are not needed.

Continue to alternate the layers of organic materials, fertilizer or manure, and soil until a maximum height of about 5 feet is achieved. Firm each layer as it is added, but do not compact it so much that air cannot move freely through it. Water each layer as it is added.



Cross Section of Layering in Compost Bin

Care of the pile. The compost pile must be kept moist (but not soggy) for proper heating and decomposition. Inadequate moisture reduces microbial activity. Excess moisture may cause undesirable decomposition and offensive odors. During dry weather it may be necessary to add supplemental water with weekly soaking. Covering with plastic can reduce moisture loss and aid decomposition during extremely dry periods. A plastic covering also protects the pile from becoming too wet during periods of heavy rainfall.

To hasten decomposition, “turn” or mix the pile periodically. This will facilitate aeration of the pile and reverse any undesirable reactions. During warm weather the pile should be turned about monthly. In cool weather, decomposition is slower and frequent turning is not necessary. During the winter, little decomposition occurs except in very large piles. The pile should be turned immediately if at any time a

strong ammonia or other offensive odor is detected.

Turning may be done by slicing through the pile and inverting each slice. Where space is available, it may be done by shifting the entire pile into another bin, later to be moved back. The main objective of turning is to shift materials from outer parts of the pile closer to the center where they are better able to heat and decompose.

About a month after starting the pile, it should be hot in the center. This indicates the pile is decomposing properly. Failure to heat might be caused by too much water, improper aeration, too little nitrogen, or too small a pile.

As materials decompose, the pile should shrink to about half of its original height. The length of time required will vary with size of pile and time of year. If the heap fails to decompose, it may be necessary to restack with some new materials.

Using Compost

When compost is ready for use, it should be dark and crumbly, with much of the original identity of the materials lost. Finished compost should have an "earthy" smell. If compost becomes old, it still makes a good soil amendment, but nitrogen may be lost through volatilization or leaching. For this reason, compost should be used as soon as possible after it is finished.

Normally, compost will be ready for use in 4 to 9 months, depending on the types of organic materials used and the climatic conditions during the composting period. For many purposes, the finished compost is easier to use if it is first screened through a 1-inch wire mesh screen to eliminate coarse or incompletely decomposed materials.

Compost can be used for potting houseplants or for starting many seeds. However, since thorough sterilization is important, especially for starting seeds, the compost should be pasteurized (sterilized) before use. Length of time for sterilization varies with volume. Place the moist compost or soil mix in an oven preheated to about 200°F and heat until the center of the mass reaches a temperature of about 160°F and maintain that temperature for 30 minutes. A probing-type thermometer (meat or candy) may be helpful for determining whether the center has been properly heated. Excess heating is not necessary and can be harmful. Be sure to remove the soil as soon as it has been sterilized, and allow to cool completely before use.